

Q-B2299

Quarterly Report on Project 15G-B2299

Contract: NSR-39-005-018

Period: 1 July 1967 - 30-September 1967

I. BRAIN PROBES

The first probe assembly was sent to NIH for evaluation with respect to sterilizability and configuration. It was returned to us with indication that it was quite satisfactory in these regards. We were requested to consider a fairly sharp bend in the probe cable just beyond the epoxy suture base, toward the plug end.

This modification was accomplished by bending the cable at high temperature. All probes are complete and coated with silastic using stannous octuate as the catalyst.

The electronic system has been frozen and is well into fabrication. We have been able to add a narrow-temperature-range facility at no increase in cost; thus the researcher will be able to record from 15 to 40°C full scale, or 35 to 40°C full scale by using simple front-panel controls.

MULTI-CHANNEL TELEMETRY

The new modulator is under active investigation. Current drains on the order of 9×10^{-6} amperes are obtainable, and frequency sensitivities on the order of 1-2% per millivolt seem realizable.

Sensitivity to temperature, etc. has not yet been studied nor have compensation techniques.

A paper on our multi-channel studies was presented at the August

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THE FRANKLIN INSTITUTE RESEARCH LABORATORIES

Stockholm meetings and apparently was well-received. We were gratified by comments from a number of European and American researchers who apparently felt that our approach was realistic and showed the promise of a practical and economical solution to the multi-channel implant problem.

The new modulator circuit approach shows promise for good sensitivity, low power requirement and will, very likely, require fewer components.

III. SENSORS

A recent visit with Dr. M. Carricker (Marine Biological Laboratories) disclosed that some work is under way in that laboratory regarding small pH and other electrodes. This will be investigated further.

IV. INFORMATION EXCHANGE

Our attendance at the Stockholm meetings gave us the opportunity to visit the Holly Hill Laboratory of the Medical Research Council. We cannot state too strongly the great value of that opportunity. There resulted a most candid and active exchange of information on their telemetry efforts and ours. Mr. Henry Light was a most gracious host during our visit, and Cliveden Weller and Arthur Solman proved most helpful. In the immediate future, we shall send Clive Weller a variety of detailed information on components, etc. which we believe will be helpful to him.

A review of the Holly Hill work with regard to the long-term recording of such data as temperature and heart rate convinced us that our own approach to the design of a micro-miniature long-term

recorder was quite valid (an independent unsupported development here to-date).

We were recently visited by Dr. Ronald Barr of the University of Missouri, who is engaged in the study of rats exposed to hard radiation. Our conversations were mutually fruitful. We will, in the near future, send Dr. Barr three Mark IV-XLL implants for exposure to about 20,000 rads. The units will be calibrated prior to exposure and rechecked in all respects after exposure. The net result will be that we shall be enabled to report on the effect of hard radiation on our implant performance. Thus another useful piece of data will become available to those researchers using the NASA temperature telemeter (Mark IV).

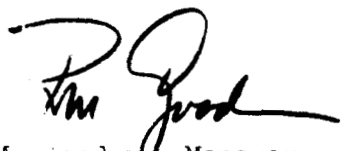
V. MAGNETIC FIELDS

Study has continued on the design of means to obtain both uniform fields above ambient earth's field and shielding to obtain fields very much below the earth's field. The papers of Wadey and Sterne are being re-examined from the point of view of applying computer techniques to produce tables from which shields could be designed with a minimum of design effort by the life scientist. A similar re-examination is in progress of the papers of Blewett with respect to Helmholtz or "Helmholtz type" coils. At the present time, a rather substantial design effort is required of the biologist to design apparatus for producing known, accurate and uniform fields somewhat above the earth's field or a small fraction of the earth's field. If tables and techniques can be made available to the biologist



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to substantially reduce this design effort, more biology can be done with limited time and funds. This effort aims at producing and making available just such simple techniques.



R. M. Goodman, Manager
Bio-Instrumentation Laboratory



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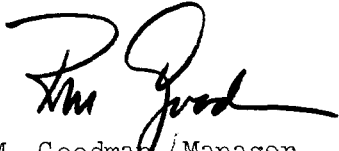
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